

We appreciate the opportunity to comment on the conceptual hydrologic model of the Jackpile mine area. The current conceptual model synthesizes existing information and presents a model of hydrologic processes occurring at the site. There are some aspects of the conceptual model that could be refined. Below are some comments/suggestions that might help refine the conceptual model.

1. It is not clear that mining/reclamation activities have resulted in elevated uranium concentrations in the Rio Paguete at the downstream boundary of the site. The uranium concentrations in surface water at the downstream boundary of the site appear to be elevated relative to the uranium concentrations at the upstream boundary of the site; however, the impact of mining/reclamation activities on uranium concentrations is not clear. Determination of the source of the uranium and the factors causing the elevated uranium concentrations in surface water downstream of the mining/reclamation activities would be useful in refining the conceptual hydrologic model of the site. Existing data or data to be collected during the expanded site investigation could be used to help clarify the effect of mining/reclamation activities.
2. Based on existing data, the Rio Moquino and Rio Paguete are losing streams in the upstream reaches of the site and become gaining streams in the downstream reaches of the site. The source of the water in the waste rock/backfill/alluvium that discharges to these streams and the factors causing groundwater to discharge to these streams is not well understood. Recharge to the groundwater system in the waste rock/backfill material and alluvium adjacent to the streams could be the result of many processes including infiltration of precipitation, infiltration of water from the Rio Moquino and Rio Paguete, or ground water discharge from the Morrison Formation. Further evaluation of local sources of recharge to and groundwater flow directions in the waste rock/backfill material and alluvium adjacent to the streams would be useful to determine the source of water discharging to the Rio Paguete and Rio Moquino and the hydrologic factors that cause groundwater to discharge to these streams in the Jackpile mine area.
3. Evaluation of all existing groundwater and surface water chemistry data would be useful in determining the source of uranium and factors affecting the geochemical evolution of water in the backfill material/alluvium adjacent to the streams. Further evaluation of oxidation/reduction potential and radiochemistry in groundwater and surface water in the area might result in a better understanding of the processes effecting uranium concentrations. Concentration of uranium due to evaporation and transpiration of surface water and shallow groundwater could be an important process effecting uranium concentrations in the area. Documentation of temporal variations in groundwater levels and water quality in the groundwater and surface water system using all existing data would be helpful in determining how groundwater conditions and water quality have changed since mining has ceased at the site. Temporal variations might help refine the conceptual model of the site. Evaluation of all the existing data should help determine data gaps that could be resolved by additional data collection during the expanded site investigation.



4. A seepage investigation and water sampling along the Rio Moquino and Rio Pagate during low flow conditions would be useful in determining location, chemistry, and fluxes of water and solutes to and from the groundwater/surface water system.
5. Water samples should be filtered using 0.45 micron pore size filters.
6. Vanadium concentrations should be determined in any future sampling because vanadium concentrations effect the solubility of uranium in water.

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